Before the

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 11 of the Commission's Rules Regarding the Emergency Alert System	)	PS Docket No. 15-94

JOINT COMMENTS OF OHIO EDUCATIONAL TELEVISION STATIONS, INC., MONROE ELECTRONICS, INC. AND TRIVENI DIGITAL, INC. ON IMPROVEMENTS TO EAS CAPABILITIES USING ADVANCED ATSC DATA BROADCASTING CAPABILITIES.

1 Introduction

Ohio Educational Television Stations (OETS), Monroe Electronics and Triveni Digital jointly submit the following comments and recommendations pursuant to the above captioned proceeding. We appreciate the great time and effort invested by the Commission in compiling this Notice of Proposed Rulemaking. The NPRM poses a question of additional technologies the Commission should be aware of that can improve the Emergency Alert System (EAS).

The named parties respectfully submit this filing, which focuses on a series of technical capabilities based on today's digital television standards, as well as rapidly evolving next generation digital television technologies.

2 Current Advanced EAS Dissemination and Relay Projects Using Existing ATSC Digital Television Capabilities

At ¶ 44 in its *Notice*, the Commission proposes to encourage SECCs to specify a satellite-based source in State EAS Plans as an alternate monitoring assignment for the Presidential Alert where it presents a reliable source of EAS messages. While acknowledging the value of satellite-based technologies, we urge the Commission to remain technologically neutral in light of the availability of alternative dissemination technologies for both IP-based CAP and FSK-based EAS alert messages. While also respectful of the commercial and non-commercial services named by the Commission in its *Notice*, we also voice concern over the concept of potentially codifying specific technologies, or even specific commercial or non-commercial providers, in Regulation, and question whether this is appropriate.

We are also concerned that such an approach could obviate or at the very least inhibit the significant progress being made on a range of alternative dissemination technologies, including ATSC digital television data broadcast capabilities.

Both Triveni Digital and Monroe Electronics have been active participants and stakeholders in broadcast ATSC standards development and technical deployment. Both organizations have been key innovators in such areas as alternative IP relay of alerts (including ATSC-based data broadcasting[1]), and next generation digital television alerting standards such as ATSC 3.0.[2]

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[1] "Ohio Educational TV Stations to Strengthen Emergency Public Information System," Governemnt Video, March 25, 2016, http://www.governmentvideo.com/article/ohio-educational-tv-stations-to-strengthen-emergency-public-information-system-/115802; "Triveni, DAS Team On Ohio Digital EAS," TV Technology, March 24, 2016, http://www.tvtechnology.com/news/0002/triveni-das-team-on-ohio-digital-eas/278247; "Triveni Digital Teams Up With Ohio Educational TV Stations and Digital Alert Systems to Strengthen Dissemination of Emergency Public Information," Broadcasting & Cable, March 23, 2016, http://www.broadcastingcable.com/thewire/triveni-digital-teams-ohio-educational-tv-stations-and-digital-alert-systems-strengthen-dissemination-emergency-public-information/154934.

[2] "NAB 2016: Seven Vendors Team Up on ATSC 3.0: Digital Alert Systems, Dolby, GatesAir, Harmonic, LG, Triveni and Zenith," TV Technology, April 17, 2016,

We urge the commission to retain its traditional neutral position regarding technology, and to respect the priorities and initiatives of state and local level EAS stakeholders, including local government, in the design of dissemination systems most appropriate for their circumstances. Below, we provide the Commission with background information below on two key areas of innovation,

2.1 DTV data broadcasting and station-to-station relay

Data services are an integral part of digital television broadcast signals and each television channel require separate data streams for technical and viewer information beyond just video and audio.

The availability of unused bandwidth in a television signal also allows pure DTV data services (also referred to as IP broadcasting, or "datacasting") . These simultaneous transmissions can deliver secure data, voice, and video alert and warning information over this otherwise unused "spare" capacity in a digital broadcast signal.

DTV data shares the same multiplex with the video and audio, and DTV uses the same fundamental MPEG-2 acquisition mechanisms to acquire data, video and audio signals. The ATSC data broadcast standard is described in ATSC document A/90. The data broadcast standard can be used for numerous applications, such as:

- Delivering declarative data such as HTML code
- Delivering procedural data such as Java code
- Delivering software, images and graphics
- MPEG-4 or H.263 video streams, and MPEG-4 audio streams
- Carouselling MPEG-2 video files

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http://www.tvtechnology.com/atsc3/0031/nab-2016-seven-vendors-team-up-on-atsc-30/278491; "Broadcast Technology Innovators Team Up for Live Demonstrations of ATSC 3.0 End-to-End Workflows at the 2016 NAB Show," Broadcasting & Cable, April 19, 2016, http://www.broadcastingcable.com/thewire/broadcast-technology-innovators-team-live-demonstrations-atsc-30-end-end-workflows-2016-nab-show/155747.

- Carouselling MP3 audio files

The current ATSC data broadcast standard covers the delivery of data from the last part of the distribution chain (multiplexer/emission transmitter) to a receiver. This ATSC data broadcast capability provides the basis for programs like the Ohio Emergency Alert System (OEAS), described below.

2.2 Current projects: the Ohio Emergency Alert System (OEAS) data broadcast system.

Current ATSC data broadcast technology is proving to be a viable and robust technology for assisting in the reliable and secure dissemination of public alert and warning messages over a wireless path that does not suffer from the same fragility as the public terrestrial Internet and at lower cost than satellite delivery.

The Ohio Educational Television Stations, Monroe Electronics, and Triveni Digital have collaborated to create Ohio Digital EAS (OEAS), a reliable and secure IP-based delivery system for distribution of emergency information for the public and first responders. The OEAS project is currently a unified collaboration between Ohio's public broadcasters, the Ohio Emergency Management Agency, the Ohio broadcast community and SECC, and additional technology providers. It was driven by the needs of the emergency community and the PTV stations in Ohio, with the vendors responding directly to those needs in cooperatively designing the system.

The OEAS system leverages ATSC digital television IP broadcast technology from Triveni Digital and DASDEC emergency messaging delivery platforms from Digital Alert Systems to provide public alerts and government communications utilizing all 12 of Ohio's public television stations. By providing public broadcasters with a simple, secure and cost-effective way of relaying existing EAS, FEMA IPAWS, and

National Weather Service emergency messages to other broadcast stations and government sites — without touching the last-mile Internet — the OEAS system strengthens statewide warning abilities during emergencies. OEAS is designed as a transport system to deliver critical information to those who broadcast it to the public or privately to first responders, not as a replacement for any current or future messaging system.

To ensure secure transmission of public alerts and government communications originating in or destined for the state of Ohio, the OEAS system uses Digital Alert Systems' DASEOC emergency operations center located at the Ohio Emergency Management Headquarters to aggregate all emergency messaging originating from the federal government, as well as state, county and local authorities. Emergency content, including CAP XML messages, multimedia and other associated data, is converted into a single data stream ready for ATSC broadcast. This stream is delivered to the 12 stations by the state's Broadcast Educational Media Commission (BEMC) through the existing, secure state fiber system.

The final step involves inserting the stream into the station's digital broadcast signal using Triveni Digital's SkyScraper® IP broadcast (or "datacast") technology. SkyScraper is a highly scalable digital content distribution system that enables the stations to organize and target content to receivers; allocate bandwidth and insert content into broadcast streams; and extract content from broadcast streams and make it available to end users. The system's DataFab and DataHub components at the state's EMA headquarters in Columbus create an EAS message stream that is distributed to all the Ohio PTV stations by secure state fiber loops with redundant delivery paths and inserted in their over-the-air broadcast signals. With DataFab, messages can be targeted to individual receivers, groups of receivers, or the entire network.

Specified receiver sites (which will initially include all LP-1, LP-2 and LP-3 EAS relay stations, and several county emergency management agencies) are being provided with emergency content management/IPAWS emulation servers with

integrated ATSC digital TV monitoring capabilities, provided by Monroe Electronics. These "IPAWS emulators" make the messaging content available to any existing make or model of EAS equipment in its native format.

Further, any existing DASDEC™ or One-Net™ CAP/EAS unit can be simply enabled with this internal ATSC monitoring capability via the latest DASDEC version 3.0 software and system keys. This allows the OEAS architecture to potentially scale to include the majority of video service providers in Ohio, and elsewhere in the nation, without the need for additional equipment.

Hurricane Sandy demonstrated that emergency messaging systems need more than the Internet, and even satellite farms, to ensure that critical information makes it out to the public and the people who keep them safe. There must be secure, alternative pathways to provide the redundancy these important systems demand. The OEAS system was designed as an enhancement to Ohio's public warning capabilities.

While the initial stage of the OEAS system provides a robust digital infrastructure for transmitting CAP alert messages, FSK audio, and even video, the system sets the stage for additional emergency communications support across the state. The OEAS system features a content-agnostic architecture that can securely transport any type of digital content, including non-public messaging, such as data and live video. This will allow first responders and other emergency officials to utilize the system as well, using the information platforms of their choice.

Any properly formatted digital signal can be delivered using the OEAS system, enabling broadcasters to continue to use the system at such time they transition to an ATSC 3.0 infrastructure.

There is robust discussion on how ATSC 3.0 can be configured for public safety purposes. However, there will continue to be a need for redundant systems using multiple technologies to move alerts and other messaging from their point of

origination to the broadcasters who delivery them to the public and first responders, just as there is today.

2.3 Replicability of the station-to-station IP data broadcast; applicability to known vulnerabilities in conventional Internet distribution of CAP alerts

While CAP alerts provides greater information and detail for public warning messaging, there are concerns whether conventional public Internet as the sole IP dissemination path is sufficiently resilient and survivable, as evidenced in the impacts of Hurricane Sandy and the progressive derecho of 2012, both discussed below.

Hurricane Sandy provides a poignant example of the impact of severe weather on the resiliency of Internet-based systems. This major storm event caused major power and Internet outages in a region of more than 60 million people. The impacts on Internet connectivity were severe, not only in NYC, Long Island, and New Jersey, but also peripheral weather-related outages as far south as the Washington DC area, and up the I-93 corridor from Boston into New Hampshire.[3] With conventional Internet disrupted in these areas, the ability to monitor CAP-based alerts was greatly impacted.[4] At the same time, anecdotal information we have received from our customers in the impacted area indicate that the broadcast EAS relay was not substantially impacted during this major storm event.

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[3] Dout Madorie, Dyn Research, "Hurricane Sandy: Initial Impact," http://research.dyn.com/2012/10/hurricane-sandy-initial-impact/; Jim Cowie, Dyne Research, "Hurricane Sandy: Outage Animation," http://research.dyn.com/2012/10/hurricane-sandy-outage-animati/; Jack Clark, "Hurricane Sandy doubled failures in US internet infrastructure," December 19, 2012, http://www.zdnet.com/article/hurricane-sandy-doubled-failures-in-us-internet-infrastructure/; Marguerite Reardon, "Hurricane Sandy disrupts wireless and Internet services," October 30, 2012, http://www.cnet.com/news/hurricane-sandy-disrupts-wireless-and-internet-services/.

[4] Additional public warning issues surrounding this event are discussed in Carl Weinschenk, "Hurricane Sandy and EAS-CAP," Broadband Technology Report, November 21, 2012. http://www.btreport.net/articles/2012/11/hurricane-sandy-and-eas-cap.html

The progressive derecho of June 2012, which tracked across a large section of the Midwestern United States (including Ohio) and into the mid-Atlantic states, resulted in widespread damage and millions of power outages across the entire affected region.[5] In Ohio alone, over 1 million lost power, with power outages widespread across roughly two-thirds of the state of Ohio. The derecho represented both the largest power outage in Ohio history. The effects to Ohio's infrastructure, including Internet availability, were evident during his period.

Even under presumably normal circumstances, we have identified numerous cases where an FSK-based EAS message is received before a CAP alert message. This can be due to numerous reasons, such as the polling interval of CAP EAS equipment, network issues at the EAS Participant, or issues at the EAS Participant's ISP.

To ground these concerns, we note the results of the first CAP RMT test in the state of Minnesota during November 2013.[6] In this test, an RMT was simultaneously issued in both CAP XML and broadcast FSK EAS formats. A report from the Minnesota Division of Homeland Security and Emergency Management indicates that 21% of EAS Participants responding the survey received the broadcast EAS message, rather than the CAP message. Of these 1/3 received the broadcast EAS message first, while 2/3 reported not receiving a CAP message at all. A further 4% received no RMT message from either CAP or broadcast EAS.

From the example above, it is clear that 21% of EAS Participants were able to air an alert message because the conventional broadcast EAS played a critical role as a

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[5] "Impact of the June 2012 Derecho on Communications Networks and Services". Public Safety and Homeland Security Bureau, Federal Communications Commission, January 2013, http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0110/DOC-318331A1.pdf; "Maryland Public Service Commission, After Action Review, June 29, 2012 Derecho Storm Event," Maryland Public Service Commission; "D.C. storm 2012: Power out for thousands, damage reported throughout D.C. area," WJLA, 30 June 2012, http://www.wjla.com/articles/2012/06/d-c-maryland-virginia-power-outages-and-road-blockages-77457.html;

[6] "Report on the Common Alert Protocol (CAP) generated Required Monthly Test (RMT) of the Emergency Alert System, 6 November 2013," prepared by the Minnesota Department of Public Safety, Division of Homeland Security and Emergency Management.

backup to the CAP system. We do not think that the experience of this state is atypical, and demonstrates the continued utility of the broadcast EAS message as a critical redundancy to the CAP based system.

We also believe this experience proves the utility of alternative IP dissemination methods, such as IP data broadcasting. ATSC data broadcast systems such as that being developed and deployed by Triveni Digital and Monroe Electronics across the State of Ohio are highly replicable, cost effective, and can provide enormous additional resiliency and reliability to the dissemination of IP based alert messaging from ATSC broadcast station to EAS Participant.

2.4 At the same time, the FSK-based EAS relay must remain part of a robust national public warning capability.

To ensure that critical information arrives where it is needed, any resilient national public warning strategy must embrace as many redundant delivery channels as possible. FSK-based EAS relay must remain a backup line of defense as part of a multiple-source system.

Elimination of the EAS relay will pose identifiable risks and dangers far in excess of any seeming benefits. Maintaining the EAS relay will provide a critical backup capability to the IPAWS-OPEN based CAP system. The EAS relay will likely remain a fundamental part of the national alert dissemination capability, upon which the distribution of national-level messaging (the EAN) is primarily based. The broadcast EAS FSK capability must remain in the event that any combination of IP networks are unavailable – for whatever reason – before, during, immediately after, or in a transitional environment after a national emergency.

3 Next Generation EAS Dissemination to the Public via ATSC 3.0

Both Monroe Electronics and Triveni Digital are active supporters of next-generation ATSC 3.0 services, are active members of ATSC standards committees,

and are intensely involved in the integration of systems and services into the ATSC 3.0 environment. Advanced Emergency Alerting (AEA) is being designed within the ATSC 3.0 ("Next Generation TV") broadcast standard, and may significantly enhance the nation's emergency preparedness and give broadcasters important new public service tools. Advanced Emergency Alerting via ATSC 3.0 may provide consumers with much greater emergency alert information, multimedia, and supporting information and instructions. ATSC 3.0 also promises higher data throughput, more robust transmission and improved indoor reception.

ATSC 3.0's Advanced Emergency Alerting capabilities are also a core part of the efforts of the Advanced Warning and Response Network (AWARN) Alliance. The AWARN Alliance, of which both Monroe Electronics and Triveni Digital are members along with major broadcast groups and other technology partners, is focused on realizing the potential of the advanced alerting capabilities of the ATSC 3.0 Next-Generation Television broadcast standard being finalized by the Advanced Television Systems Committee (ATSC). One of the strong benefits of ATSC 3.0 emergency alerting will be the use of a one-to-many broadcast distribution system that bypasses bandwidth bottlenecks associated with conventional systems.

Systems using ATSC 3.0 could automatically alert millions of receivers including home TVs, smartphones, tablets and computers at once to an emergency and provide a successive stream of comprehensive emergency multimedia alerts.

Key standards around ATSC 3.0 and emergency alerting are still under development at the time of this filing. This new technical standard, part of ATSC 3.0, will include provisions for a range of features useful for both broadcasters and television viewers - such as a TV set "wake-up" capability, and the ability for broadcasters to relay additional info about the emergency to the television set.

Companies like Monroe Electronics and Triveni Digital are ensuring their products will support both legacy ATSC standards (such as ATSC 1.0) while supporting a

seamless integration to the future ATSC 3.0 standard.[7] This means that future technology can be in large part enabled by EAS Participants' current investments in their EAS and other equipment, reducing the complexity and cost hurdles for migrating to ATSC 3.0.

4 The deployment timeframe for ATSC 3.0 in the broad marketplace may be several years in the future. However, we urge the Commission in its examination of the emergency alert system to avoid choices that could preclude the use of current or future technologies, and to not undertake any ruling or decision that may inhibit industry innovation and development.

In the Commission's considerations of advanced or future architectures, The Ohio Educational Television Stations, Monroe Electronics and Triveni Digital jointly urge the Commission to remain technologically neutral in its deliberations, both in terms of allowing the development of advanced dissemination capabilities like ATSC datacasting and ATSC 3.0; and to not take decisions that would inhibit or stifle forward-looking development on emergency messaging platforms like the DASDEC or programs such as the OEAS system.

Monroe Electronics, and systems like its DASDEC emergency messaging platform, have been integral to numerous industry developments, such as multilingual EAS messaging, alert relay via ATSC datacasting, and future capabilities such as ATSC 3.0 Advanced Emergency Alerting and AWARN. We desire to remind the Commission of the viability of alternative technologies in the creation of a robust and resilient public warning architecture that may be more cost effective than satellite based systems, while providing similar capabilities and reliability. Some of these technologies are early on the planning spectrum, and may be adversely

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[7] See for example "Triveni to Launch ATSC 3.0 Guide Builder at 2016 NAB Show: Signaling and announcement generator for ATSC 3.0 is backward compatible with legacy standards," TV Technology, 11 April 2016. http://www.tvtechnology.com/nab-show/0026/triveni-to-launch-atsc-30-guide-builder-at-2016-nab-show/278416.

impacted by some of the suggestions on future architectures posed by the Commission in its NPRM.

For this reason, we urge the Commission to firstly, remain technologically agnostic in relation to any amendment of its rules to reflect alternative alert dissemination capabilities, and secondly to defer consideration of matters relating to advanced alerting architectures to industry, or at least to a separate multi-stakeholder working group.

Respectfully Submitted,

/s/ David Carwile
Administrator
Ohio Educational Television Stations, Inc. (OETS)

/s/ Edward Czarnecki, Ph.D.
Senior Director – Strategy and Global Government Affairs
Monroe Electronics, Inc.

/s/ Richard Chernock, Sc.D.
Chief Science Officer
Triveni Digital, Inc.